

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(c), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(c) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on February 17, 2009 has been entered.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1-4, 6-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Honda (JP 2003-277308) in view of Honda et al. (US Pat. 3,814,713) and Yamaguchi et al. (US Pat. 4,376,854) as evidenced by Nakano et al. (US Pat. 4,876,324).

Considering Claims 1, 2, 4, 9 and 11: Honda teaches a method of making resorcinol-formaldehyde/formalin resin comprising adding to a water solvent 24 parts by weight per 100 parts water of resorcinol (¶0024), calcium/inorganic salt in an amount of 64 parts by weight per

100 parts water (¶0024) forming a mixture; adding an acid catalyst (¶0024); dropping 37% formaldehyde solution over 5 hours/300 minutes at 50 degrees C(¶0024) to give a formaldehyde to resorcinol ratio of 0.584 moles (¶0024); then stirring the mixture for an hour (¶0024); removing the reactant mother liquor/aqueous phase (¶0024).

Honda does not teach adding a solvent to the reaction mixture prior to the addition of formaldehyde. However, Yamaguchi et al. teaches using a mixture of water and ketone solvent, such as methyl ethyl ketone or acetone, as the reaction medium for a resorcinol formaldehyde condensation (2:19-27). Honda and Yamaguchi et al. are analogous art as they are concerned with the same field of endeavor, namely resorcinol-formaldehyde resins. It would have been obvious to a person having ordinary skill in the art at the time of invention to have used the ketone of Yamaguchi et al. in the process of Honda, and the motivation to do so would have been, as Nakano et al. suggests, a biphasic reaction medium will lower the molecular weight of a phenol formaldehyde resin (6:24-40).

Honda does not teach the solvent being added in the claimed amount during the first step. However, differences in concentration generally will not support the patentability of subject matter encompassed by the prior art unless there is evidence indicating such concentration is critical. As shown by Nakano et al., the amount of solvent added to the mixture will affect the molecular weight of the resin (6:24-40), the amount of solvent is a result effective variable. See MPEP § 2144.05. It would have been obvious to a person having ordinary skill in the art at the time of invention to have optimized the amount of water added through routine optimization, and the motivation to do so would have been to produce a low molecular weight resin.

Honda does not teach diluting the product with an organic solvent. However, Honda et al. teaches adding an organic ketone, such as methyl ethyl ketone, to a resin mixture following the condensation reaction between resorcinol and formaldehyde in an amount of 4 to 6 times the amount of resin. Honda et al. then teaches extracting the mixture with water/adding water to the solution, allowing the layers to separate, and then removing the aqueous layer (5:1-43). Honda and Honda et al. are analogous art as they are concerned with the same field of endeavor, namely producing resorcinol formaldehyde resins with low levels of unreacted resorcinol. It would have been obvious to a person having ordinary skill in the art at the time of invention to have used the solvent dilution and water extraction step of Honda et al. in the process of Honda, and the

motivation to do so would have been, as Honda et al. suggests, to reduce the amount of unreacted resorcinol in the composition (5:36-40).

Honda does not teach the water being added in the claimed amount during the extraction step. However, differences in concentration generally will not support the patentability of subject matter encompassed by the prior art unless there is evidence indicating such concentration is critical. As shown by Honda et al. the amount of water added to the mixture will affect the amount of resorcinol removed from the mixture (5:5-9), the amount of water is a result effective variable. See MPEP § 2144.05. It would have been obvious to a person having ordinary skill in the art at the time of invention to have optimized the amount of water added through routine optimization, and the motivation to do so would have been to fully remove the desired amount of unreacted resorcinol.

Honda does not teach adding the acid catalyst after the mixing/stirring the other reaction components. However, the selection of any order of mixing ingredients is *prima facie* obvious. See MPEP § 2144.04. It would have been obvious to a person having ordinary skill in the art at the time of invention to have added the catalyst after mixing the other components, but prior to the addition of the formaldehyde.

Considering Claim 3: The Office realizes that all of the claimed effects or physical properties are not positively stated by the reference(s). However, the reference(s) teaches all of the claimed ingredients and process steps. Therefore, the claimed effects and physical properties, i.e. amount of unreacted monomers and high molecular weight products would implicitly be achieved by a process using the claimed ingredients and process steps. If it is the applicant's position that this would not be the case: (1) evidence would need to be provided to support the applicant's position; and (2) it would be the Office's position that the application contains inadequate disclosure that there is no teaching as to how to obtain the claimed properties with only the claimed ingredients.

Considering Claim 6: Honda does not teach adding a mixture of solvents to the reaction mixture. However, Okamura et al. teaches several solvents are suitable for their invention (Derwent Abstract). It would have been obvious to a person having ordinary skill in the art at the time of invention to have used a mixture of solvents in the method of Honda, and the motivation to do so would have been that it is *prima facie* obvious to combine two compositions each of which is

taught by the prior art to be useful for the same purpose, in order to form a third composition to be used for the very same purpose. See MPEP § 2144.06.

Considering Claims 7 and 8: Honda teaches the salt as preferably being calcium chloride (¶0013).

Considering Claim 10: Honda teaches the catalyst as preferably being hydrochloric acid (¶0019).

Considering Claim 12: Honda does not teach the addition of formaldehyde as taking place over 20 to 120 minutes. However, differences in reaction time generally will not support the patentability of subject matter encompassed by the prior art unless there is evidence indicating such reaction time is critical. See MPEP § 2144.05. As the rate of the formaldehyde addition controls the reaction rate it is a result effective variable. It would have been obvious to a person having ordinary skill in the art at the time of invention to have optimized the reaction time through routine optimization, and the motivation to do so would have been a shorter reaction time will make the process more cost efficient and commercially viable.

Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Honda (JP 2003-277308) in view of Honda et al. (US Pat. 3,814,713) and Yamaguchi et al. (US Pat. 4,376,854) as evidenced by Nakano et al. (US Pat. 4,876,324) as applied to claim 1 above, and further in view of Okamura et al. (US 5,368,928).

Considering Claim 13: Honda, Honda et al. and Yamaguchi et al. collectively teach the method of claim 1 as shown above.

Honda does not teach forming a dispersion comprising the resin. However, Okamura et al. '928 teaches forming an aqueous dispersion of a resin by diluting the resin solution with water; stripping/distilling the organic solvent and concentrating the composition to a desired solids content (Example 1). Honda and Okamura et al. '928 are analogous art as they are concerned with the same field of endeavor, namely low molecular weight resociranol formaldehyde resin compositions. It would have been obvious to a person having ordinary skill in the art at the time of invention to have used the method of Okamura et al. '928 in the method of Honda, and the motivation to do so would have been, as Okamura et al. '928 suggests, to provide an aqueous solution of the resin.

Honda does not teach the claimed solids content. However, differences in concentration generally will not support the patentability of subject matter encompassed by the prior art unless there is evidence indicating such concentration is critical. As the solids content controls the flowability of a solution, it is a result effective variable. It would have been obvious to a person having ordinary skill in the art at the time of invention to have optimized the solids content of the solution through routine optimization, and the motivation to do so would have been to form a solution that is processable.

Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Honda (JP 2003-277308) in view of Honda et al. (US Pat. 3,814,713) and Yamaguchi et al. (US Pat. 4,376,854) as evidenced by Nakano et al. (US Pat. 4,876,324) as applied to claim 1 above, and further in view of Swedo (US 2004/0116647).

Considering Claim 14: Honda, Honda et al. and Yamaguchi et al. collectively teach the method of claim 1 as shown above.

Honda does not teach further processing the organic phase. However, Swedo teaches diluting the organic phase of a phenol formaldehyde resin by diluting it with acetone, drying the solution/azeotropically removing water, and filtering the solution (¶0032). Honda and Swedo are analogous art as they are concerned with the same field of endeavor, namely phenolic formaldehyde condensation resins. It would have been obvious to a person having ordinary skill in the art at the time of invention to have used the step of Swedo in the process of Honda, and the motivation to do so would have been, as Swedo suggests, removing water from the organic phase.

Claims 15-18 and 20-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Honda (JP 2003-277308) in view of Honda et al. (US Pat. 3,814,713) and Yamaguchi et al. (US Pat. 4,376,854) as evidenced by Nakano et al. (US Pat. 4,876,324).

Considering Claims 15, 16, and 19-22: Honda teaches a resin made by a method of making resorcinol-formaldehyde/formalin resin comprising adding to a water solvent 24 parts by weight per 100 parts water of resorcinol (¶0024), calcium/inorganic salt in an amount of 64 parts by weight per 100 parts water (¶0024) forming a mixture; adding an acid catalyst (¶0024); dropping

37% formaldehyde solution over 5 hours/300 minutes at 50 degrees C(¶0024) to give a formaldehyde to resorcinol ratio of 0.584 moles (¶0024); then stirring the mixture for an hour (¶0024); removing the reactant mother liquor/aqueous phase (¶0024).

Honda does not teach adding a solvent to the reaction mixture prior to the addition of formaldehyde. However, Yamaguchi et al. teaches using a mixture of water and ketone solvent, such as methyl ethyl ketone or acetone, as the reaction medium for a resorcinol formaldehyde condensation (2:19-27). Honda and Yamaguchi et al. are analogous art as they are concerned with the same field of endeavor, namely resorcinol-formaldehyde resins. It would have been obvious to a person having ordinary skill in the art at the time of invention to have used the ketone of Okamura et al. in the process of Honda, and the motivation to do so would have been, as Nakano et al. suggests, a biphasic reaction medium will lower the molecular weight of a phenol formaldehyde resin (6:24-40).

Honda does not teach the solvent being added in the claimed amount during the first step. However, differences in concentration generally will not support the patentability of subject matter encompassed by the prior art unless there is evidence indicating such concentration is critical. As shown by Nakano et al., the amount of solvent added to the mixture will affect the molecular weight of the resin (6:24-40), the amount of solvent is a result effective variable. See MPEP § 2144.05. It would have been obvious to a person having ordinary skill in the art at the time of invention to have optimized the amount of water added through routine optimization, and the motivation to do so would have been to produce a low molecular weight resin.

Honda does not teach diluting the product with an organic solvent. However, Honda et al. teaches adding an organic ketone, such as methyl ethyl ketone, to a resin mixture following the condensation reaction between resorcinol and formaldehyde in an amount of 4 to 6 times the amount of resin. Honda et al. then teaches extracting the mixture with water/adding water to the solution, allowing the layers to separate, and then removing the aqueous layer (5:1-43). Honda and Honda et al. are combinable as they are concerned with the same field of endeavor, namely producing resorcinol formaldehyde resins. It would have been obvious to a person having ordinary skill in the art at the time of invention to have used the solvent dilution and water extraction step of Honda et al. in the process of Honda, and the motivation to do so would have

been, as Honda et al. suggests, to reduce the amount of unreacted resorcinol in the composition (5:36-40).

Honda does not teach the water being added in the claimed amount during the extraction step. However, differences in concentration generally will not support the patentability of subject matter encompassed by the prior art unless there is evidence indicating such concentration is critical. As shown by Honda et al. the amount of water added to the mixture will affect the amount of resorcinol removed from the mixture (5:5-9), the amount of water is a result effective variable. See MPEP § 2144.05. It would have been obvious to a person having ordinary skill in the art at the time of invention to have optimized the amount of water added through routine optimization, and the motivation to do so would have been to fully remove the desired amount of unreacted resorcinol.

Honda does not teach adding the acid catalyst after the mixing/stirring the other reaction components. However, the selection of any order of mixing ingredients is *prima facie* obvious. See MPEP § 2144.04. It would have been obvious to a person having ordinary skill in the art at the time of invention to have added the catalyst after mixing the other components, but prior to the addition of the formaldehyde.

Considering Claim 17: The Office realizes that all of the claimed effects or physical properties are not positively stated by the reference(s). However, the reference(s) teaches all of the claimed ingredients and process steps. Therefore, the claimed effects and physical properties, i.e. amount of unreacted monomers and high molecular weight products would implicitly be achieved by a process using the claimed ingredients and process steps. If it is the applicant's position that this would not be the case: (1) evidence would need to be provided to support the applicant's position; and (2) it would be the Office's position that the application contains inadequate disclosure that there is no teaching as to how to obtain the claimed properties with only the claimed ingredients.

Response to Arguments

Applicant's arguments with respect to claims 1-4, 6-18, and 20-23 have been considered but are moot in view of the new ground(s) of rejection.

Correspondence

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Liam J. Heincer whose telephone number is 571-270-3297. The examiner can normally be reached on Monday thru Friday 7:30 to 5:00 EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark Eashoo can be reached on 571-272-1197. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Mark Eashoo/

Supervisory Patent Examiner, Art Unit 1796

LJH

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